131594

DIRECT TESTIMONY OF

ABNEY A. (SKIP) SMITH, JR.

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2000-0170-E

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Abney A. (Skip) Smith, Jr.; my business address is 111 Research Drive, Columbia, SC 29203

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by South Carolina Electric and Gas Company (SCE&G and the "Company") and serve as Project Manager for the Urquhart Re-powering Project.

Q. DESCRIBE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCE.

A. I received a bachelor of science degree from the United States Military Academy at West Point and a Bachelor of Science degree in civil/structural engineering from The University of South Carolina. I also completed the Public Utility Executive Program at the University of Michigan School of Business. I began my career with SCE&G in 1973 on the V.C. Summer Nuclear Station construction project working in the Quality Assurance Department and overseeing the quality of construction and startup of the plant. I was assigned as Manager, Quality Control for Nuclear Operations for approximately two years and subsequently assigned to coordinate our Company's productivity program. I later returned to Summer Station as Manager,

Administration and Facilities. I completed the senior reactor operator certification program and worked in the Summer Station outage management group during a refueling outage. I was next assigned to manage the Cope Power Plant Project, and subsequently, managed the Power Block group and the Cogen South project with WESTVACO. I was reassigned to manage the Company's Transit and Fleet organizations for a year and reassigned to the Urquhart Re-powering Project in the spring of 1999.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to provide a general description of the proposed Urquhart Re-powering Project; describe the arrangements entered into by SCE&G and Duke-Fluor Daniel (D/FD) with respect to the engineer, procure, construct (EPC) contract; and provide information regarding the cost of the proposed facility.

Q. PLEASE DESCRIBE THE PROPOSED URQUHART RE-POWERING PROJECT WHICH SCE&G PLANS TO BUILD.

A. SCE&G plans to install two new combustion turbine-generators at our Urquhart Station in Beech Island, Aiken County. See my Exhibit No. _____(AAS-1) for location of project. These turbine-generators will be General Electric 7FA turbine-generators rated at approximately 150 MW each. Two of the existing Urquhart steam turbine-generators, with a capacity of approximately 75 MW each, will be re-powered by steam produced in two new heat recovery steam generators using the exhaust energy from the two new combustion turbines. An inlet chiller for the combustion turbines will be installed to provide an additional 41 MW capacity during the summer

peaking months. The total combined-cycle capacity for these units will be approximately 491 MW.

Energy from the new heat recovery steam generator will also be used to provide feedwater heating for the existing Urquhart Unit #3. This feedwater heating capability will not increase the generation capacity for Unit #3 which is approximately 100 MW, but will increase the generation efficiency. The existing coal-fired boilers for Units 1 & 2 will be shut down. Unit #3's coal-fired boiler will continue to operate. The combined-cycle units will be capable of firing natural gas or distillate (No. 2) fuel oil, with natural gas being the primary fuel. The Urquhart Station currently consists of three coal-fired boilers for Units 1, 2 and 3.

Also located at the Urquhart site are four simple cycle combustion turbines (CT 4, 5, 6 and 7) capable of firing natural gas and distillate (No. 2) fuel oil, with natural gas being the primary fuel. The fuel oil for these four combustion turbines will continue to be stored in an existing fuel oil tank.

Each gas turbine will include an advanced firing temperature, combustion turbine air compressor section, gas combustion system with dry low NOx combustors, power turbine, water injection for NOx control when firing distillate oil, and a 60-hertz (Hz), 18-kilovolt (kV) generator. Each gas turbine is designed to produce approximately 150 MW of net electrical power. The turbine is the heart of a combined-cycle power system.

A. **PLEASE PROVIDE THE COMMISSION WITH A GENERAL DESCRIPTION OF HOW THE PRODUCTION SYSTEM WILL WORK.**

First, air is filtered and compressed in a multiple-stage axial flow compressor. Compressed air and fuel (natural gas or fuel oil) are mixed and combusted in the turbine chamber. Exhaust gas from the combustion chamber is expanded through a multi-stage power turbine that drives both the air compressor and electric power generator. Exhaust gas exiting the power turbine at approximately 1100 degrees F is ducted to an unfired boiler commonly known as a heat recovery steam generator where steam is produced to generate additional electricity in a steam turbine-generator. The combustion turbines are designed to operate in the dry low-NOx mode at loads from about 50% up to base load rating.

During the higher ambient temperature conditions, an inlet air chiller will cool the air moving through the inlet filter and compressor of each combustion turbine. This cooling of the inlet air causes the inlet air to be more dense, results in a higher mass flow through the gas turbine and increases the power output of both combustion turbine-generators by a total of 41 MW. An environmentally friendly refrigerant is circulated through the combustion turbine inlet chiller coils and cools 3,200,000 lb/hr of inlet air for each combustion turbine.

Unfired, horizontal, natural circulation, single pressure heat recovery steam generator (HRSG) systems will extract heat from the exhaust of each gas turbine. Exhaust gas entering the HRSG at approximately 1100 degrees F will be cooled to approximately 300 degrees F by the time it leaves the HRSG exhaust stack. The heat recovered is used in the combined-cycle plant for steam generation and feedwater

heating. Each HRSG will include a high-pressure superheater, high pressure evaporator, high pressure economizer, reheat section to reheat partially expanded steam, and a high pressure feedwater heater that will serve as part of the feedwater heating for Unit 3.

The Urquhart Station Re-powering Project will include two existing reheat, condensing steam turbines designed for variable pressure operation. The high-pressure portion of the steam turbine receives high-pressure, super-heated steam from the HRSGs and exhausts to the reheat section of the HRSGs. The steam from the reheat section of the HRSGs is supplied to the intermediate-pressure section of the turbine that expands to the low-pressure section. Each steam turbine is designed to produce approximately 75 MW of electrical power without additional fuel consumption.

The Urquhart Station project will use combined-cycle power generation technology to maximize generation efficiency and minimize fuel use. The thermal efficiency for this technology is typically in the 50% range, as compared to the typical utility steam electric power plant of approximately 35% and the typical gas turbine simple-cycle plant of approximately 36%.

The existing "once-through" cooling systems for Units 1 and 2 will be used to handle the cooling demands for the re-powered steam turbines. The existing cooling capacity is sufficient to meet the re-powered steam turbines' cooling requirements. The cooling needs of the new combustion turbine-generators will be vented to the atmosphere with the use of a closed cooling system.

Pipeline quality natural gas will be delivered to the plant boundary at a pressure sufficient for use in the combustion turbine generators. Distillate fuel oil will be delivered at the plant site by tanker trucks and stored in two new storage tanks with a capacity of 1,200,000 gallons each.

The plant control system will be comprised of existing and new Westinghouse WDPF Distributed Control System (DCS). GE Mark VI turbine controls will be installed on the new combustion turbine-generators and existing steam turbine generators. This latest technology control system will give the combined-cycle units excellent operating flexibility.

My Exhibit No._____(AAS-2) shows the general arrangement of the equipment on the site.

Q. BY WHAT PROCESS DID THE COMPANY ENTER INTO A CONTRACT ARRANGEMENT WITH DUKE/FLUOR DANIEL FOR AN ENGINEER, PROCURE, CONSTRUCT CONTRACT?

A. The Urquhart Re-powering Project will be constructed by Duke/Fluor Daniel under an EPC (Engineer, Procure, Construct), lump sum contract. Project construction is scheduled to begin in September, 2000, with Substantial Completion of the units achieved by June 1, 2002. Commercial Operation of the units is planned for June, 2002. Performance testing and final contract completion should be achieved by the fall of 2002.

Subsequent to the Company's decision to self-build its next increment of generation, the Fossil/Hydro Generation Group initiated additional engineering studies that included discussions with several combustion turbine-generator suppliers

to gather the latest data on technical specifications, costs and availability for these machines. These equipment suppliers informed us that the frame 7 size combustion turbine-generators that we preferred would not be available to support our summer, 2002 schedule for having this additional 300 MW of peaking capacity available. These suppliers informed us that the combustion turbine-generator market had strengthened considerably during the last two years and that the demand for these machines was anticipated to accelerate for the next five years.

We contacted three architect-engineer (A-E) firms with which we had previously done business and inquired about their ability to find us these combustion turbine-generators, and complete an EPC project for us that would give us this 300 MW of peaking capacity by June 1, 2002. Only D/FD responded favorably. The Company has had excellent prior experience with D/FD as an EPC contractor for the Cope Power Plant Project. We subsequently signed a memorandum of understanding with D/FD to purchase the two GE Frame 7FA combustion turbine-generators and to negotiate an EPC, lump sum contract for building the project via an "open book" Jointly Developed Phased Pricing approach (JDPP). D/FD signed a memorandum of understanding with GE to lock-in the combustion turbine-generators to support our June 1, 2002 completion schedule.

The JDPP approach utilized an "open book" relationship during the definition and development phase of the project. As the design evolved, SCE&G was an integral part of the definition of the plant, including such items as redundancies, equipment selection, arrangements and operating philosophies. As D/FD developed the cost estimate associated with the jointly developed design, SCE&G was involved in

reviewing and accepting the costs, unit rates, productivity factors, contingency approach and escalation developed by D/FD. When this information had been developed and integrated into the project cost estimate, a target price was established and became a basis for establishing a final EPC contract lump sum price, at which time the "book" was closed.

The JDPP approach involved SCE&G and D/FD agreeing on a list of major equipment to be bid and the subsequent agreement on the technical requirements, supplier, fixed pricing and terms and conditions for this equipment. The major equipment for the Urquhart project includes the following equipment and suppliers: combustion turbine-generators (GE), heat recovery steam generators (Nooter/Eriksen), main step-up transformers (ABB), distributed control system (Westinghouse), demineralized water system (water and power). This equipment represents approximately 43% of the EPC contract lump sum price.

Q. DISCUSS THE MAJOR COMPONENTS OF THE CONTRACT BETWEEN DUKE-FLUOR DANIEL AND SCE&G.

A. The engineer, procure, construct (EPC) contract is a comprehensive document setting forth in detail the requirements and criteria for the design, procurement, construction, operator training, testing and commissioning of the combined-cycle facility. It defines the risks for each party, the responsibilities of each party, the terms of payment, warranties, guarantees and the remedies for failure to perform. The two parties to the Contract are SCE&G and D/FD. D/FD is a general Partnership formed in accordance with the laws of North Carolina, and whose general partners are Duke Project Services, Inc. and Fluor Daniel Illinois, Inc. D/FD's overall performance and

financial stability are guaranteed by the respective parent companies, Duke Capital Corporation and Fluor Corporation.

There are several major components of the Contract. The first is that the Contract is an EPC contract based on a lump sum price that includes escalation. This Contract provides single point responsibility. D/FD is responsible for the engineering, the purchasing of all equipment and materials, construction, performance testing and commissioning.

The second key point is that the contract lump sum price includes fixed pricing for the major equipment based on technical specifications and equipment suppliers reviewed and approved by SCE&G, and based on competitive bids. The major equipment includes the combustion turbine-generators, heat recovery steam generators, main step-up transformers, demineralized water system and DCS. This major equipment pricing represents approximately 43% of the contract cost.

The third key component of the Contract pertains to warrantees and guarantees. The Contract provides a single point responsibility for comprehensive material and workmanship warranty and a comprehensive equipment and system performance guarantee. The performance guarantees and applicable liquidated damages are as follows:

*Net Unit Output of turbine-generator @ $640 for each kw below the performance guarantee (trade-off allowed between units within 1% cap)

*Net Unit Heat Rate of turbine-generator @ $20,400 for each btu/kWh (LHV) above the performance guarantee (trade-off same as above)

*HP steam flow of HRSG @ $200/pphp/unit below the performance guarantee.

*HP steam pressure drop @ $5800/psi/unit above performance guarantee.

*HP steam system delta temperature @$41,800/degrees F above the performance guarantee.

*HP steam temperature @ $41,800/degree F/unit below the performance guarantee.

*Gas side pressure drop @ $271,000/inch of water/unit greater than the performance guarantee.

*Reheat pressure drop @ $21,000/psi/unit greater than the performance guarantee.

*Reheat steam temperature @ $34,400/degree F/unit less than the performance guarantee.

*Hot reheat system delta temperature @$34,400/degree F/unit above the performance guarantee.

*Unit 3 feedwater preheater outlet temperature @$75,000/degree F/unit below the performance guarantee.

*Unit 3 feedwater preheater outlet delta temperature @$75,000/degree F above the performance guarantee.

*Unit 3 feedwater system pressure drop @ $2,000/psi above the performance guarantee.

*Unit turndown capability

*Unit reliability run for 48 hours.

*Air Emissions per guaranteed values of each combustion turbine.

*Noise emissions per guaranteed values of the applicable major equipment.

*Substantial Completion by June 1, 2002. Liquidated damages for the combustion turbine generators are as follows: $20,000/day for 1-30 days; $25,000/day for 31-60 days; $30,000/day for over 60 days. Substantial completion is achieved when:

(1) The output of each unit, consisting of one CTG, one HRSG and one Steam Turbine is equal to or greater than 95% of the guaranteed unit output;

(2) The heat rate of each unit is less than or equal to 105% of the guaranteed heat rate;

(3) The emissions guarantees are satisfied;

(4) The noise guarantee for the CTGs is satisfied; and

(5) The unit has completed a 48 hour reliability run while meeting performance criteria (1)-(4).

The fourth key element of the contract is that the project scope is defined in detail as follows:

*D/FD is to provide engineering and design, furnish and expedite materials and equipment, construct the facility, install equipment, train operating personnel, commission and performance test the units.

*There are specific requirements for the organization and staffing of the project, and for the job progress reporting.

*The technical requirements for the project are defined through the description of the design and performance criteria for the plant systems. The quality of design is governed by reference to industry codes and standards and by the specification of design criteria.

*SCE&G is given specific rights to have an active input into the design, to review and approve engineering documents, and to participate in the quality review program.

The fifth key aspect of the contract relates to the commercial terms and conditions and may be summarized as follows:

*The Contract General Terms and Conditions are defined in detail.

*Each party's responsibilities and rights under the Contract are spelled out in detail.

*D/FD is required to carry insurance to protect their work and workers.

*Payment is based upon a monthly payment schedule derived from a predicted cash flow and milestone schedule. If SCE&G is dissatisfied with the progress of the project and D/FD does not satisfactorily respond to requests for improvement, SCE&G can withhold payment(s) until D/FD gives a satisfactory response.

*The change order procedure set forth in the Contract insures tight control of changes and provides a procedure for pricing changes on a lump sum basis before any work is done. If the change cannot be priced accurately up front, then the method of cost accounting is described to provide SCE&G with a clear understanding of the cost of the change.

Q. WHAT DOES SCE&G ESTIMATE THE TOTAL PRICE OF THE PROJECT TO BE?

A. The total price of the plant is $256,035,641. This price includes the following:

(1) an EPC contract price with D/FD of $189,477,000

(2) a project management cost of $38,550,000, which includes costs for project development and management, operations overview and training, permitting, existing steam turbine and other associated equipment upgrades, spare parts, South Carolina Pipeline work for a new metering and regulation station and gas line re-routing on the plant site and contingency. Also included are the dollars that we estimate for the inlet air chiller. We are presently working with D/FD on the proposal evaluation for this equipment that will give us an additional 41 MW's during our summer peaking load.

(3) $5,037,400 for the new substation and transmission upgrade

(4) $22,971,251 for AFUDC.

This total project will give us a facility with reliable and efficient capacity just under 600 MW at a reasonable cost.

Q. HOW WILL SCE&G MANAGE IMPLEMENTATION OF THE DUKE-FLUOR DANIEL CONTRACT?

A. SCE&G, through its Fossil/Hydro Operations Group, will oversee the technical and commercial aspects of the project. The organization will consist of a project manager and engineering, operations, purchasing, contract administration, financial and project management personnel. The project team will work in Columbia and at the Urquhart Station, and oversee all aspects of the EPC Contract.

R. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

SCE&G Generation

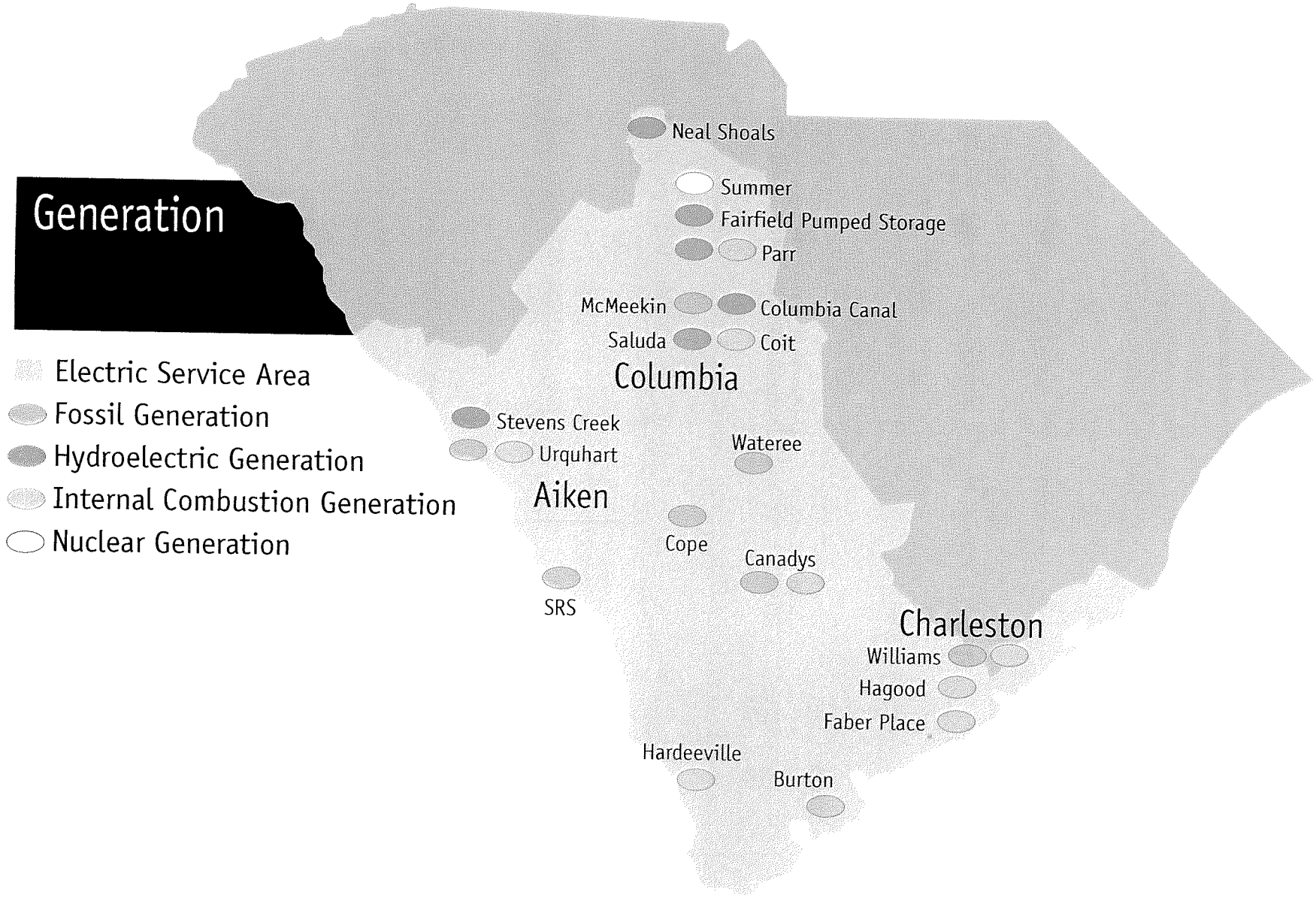
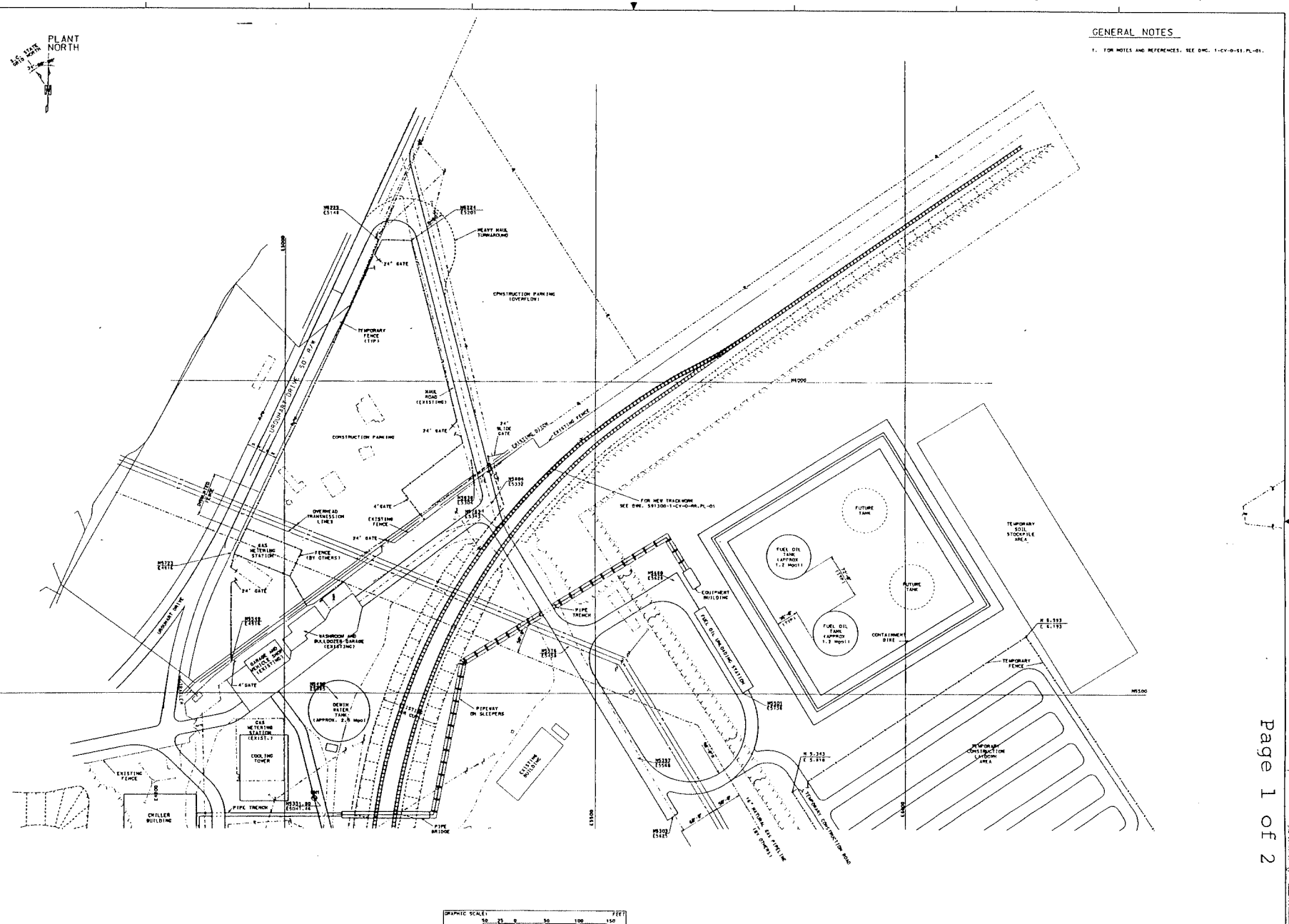


EXHIBIT NO. ____ (AAS-1)



REV	DATE	REVISION DESCRIPTION
A	3/14/00	RELEASED FOR BIDS
B	3/24/00	RELEASED FOR BIDS

DUKE/FLUOR DANIEL

PROJECT MANAGER	T.C.V.	3/21/00
PROJECT ENGINEER	D.N. TOM	3/21/00
PROJECT CONTROLS	P.W.P.	3/21/00
PROJECT MANAGER	J.M. MORGAN	3/21/00
ASSOCIATE ENGINEER	D.N. TOM	3/21/00
LEAD ENGINEER	J.M. MORGAN	3/21/00
PROJECT ENGINEER	D.N. TOM	3/21/00
ELECTRICAL ENGINEER	L.S.W.	3/21/00
LEAD DRAFTSMAN	L.S. WRIGHT	3/21/00
GENERAL FOREMAN	S.S.T.	3/21/00
PROJECT MANAGER	R.M. HARTLEY	3/21/00
PROJECT ENGINEER	D.N. TOM	3/21/00
PROJECT MANAGER	M.B. SMITH	3/21/00

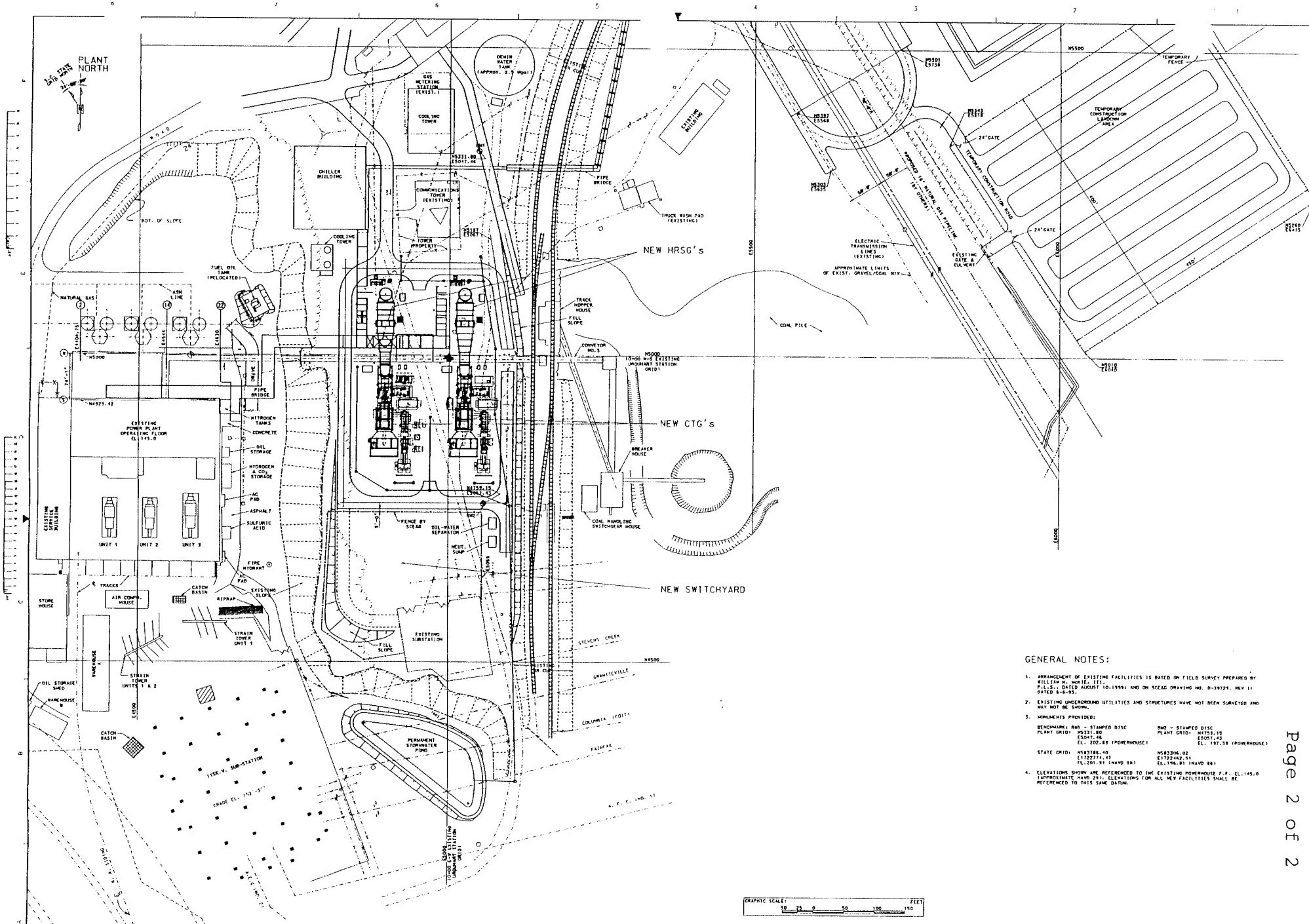
SOUTH CAROLINA ELECTRIC & GAS CO.
UROUHART STATION REPOWERING
AIKEN COUNTY, SC

SITE PLAN
SHEET 2

591300 - 1 - CV - 0 - SI.PL - 02 - B

Page 1 of 2

EXHIBIT NO. (AAS-2)



GENERAL NOTES:

1. ARRANGEMENT OF EXISTING FACILITIES IS BASED ON FIELD SURVEY PREPARED BY WILLIAM H. MORIE, III., P.L.S., DATED AUGUST 10,1995 AND ON SCE&G DRAWING NO. D-39729, REV 11 DATED 6-8-95.
2. EXISTING UNDERGROUND UTILITIES AND STRUCTURES HAVE NOT BEEN SURVEYED AND MAY NOT BE SHOWN.
3. MONUMENTS PROVIDED:

BENCHMARK: BM1 - STAMPED DISC		BM2 - STAMPED DISC
PLANT GRID:	N5331.80 E5047.46 EL. 202.69 (POWERHOUSE)	PLANT GRID: N4755.15 E5047.43 EL. 197.39 (POWERHOUSE)
STATE GRID:	N583786.40 E1722774.43 EL.201.91 (NAVD 88)	N583306.02 E1722462.51 EL.196.81 (NAVD 88)

4. ELEVATIONS SHOWN ARE REFERENCED TO THE EXISTING POWERHOUSE F.F. EL.145.0 (APPROXIMATE NAVD 29). ELEVATIONS FOR ALL NEW FACILITIES SHALL BE REFERENCED TO THIS SAME DATUM.

REV	DATE	REVISION DESCRIPTION	DRAWN CIVIL	STRUCT MECH	ELEC	PROJ
A	3/1/00	RELEASED FOR BIDS	CGT	JPW	LSW	WBS
B	3/1/00	RELEASED FOR BIDS	CGT	JPW	LSW	WBS
C	3/31/00	RELEASED FOR BIDS	CGT	JPW	LSW	WBS

DUKE/FLUOR DANIEL

DESIGN BY: PC TURNBOUGH	APPROVED: FCT 3/31/00
DRAWN BY: PV POWERS	APPROVED: PVP 3/31/00
CHECKED BY: JP MORIAN	APPROVED: JPM 3/31/00
DESIGN SUPERVISOR: JP MORIAN	APPROVED: JPM 3/31/00
PROJECT ENGINEER: PV POWERS	APPROVED: PVP 3/31/00
PROJECT MANAGER: LS WRIGHT	APPROVED: LSW 3/31/00
PROJECT DIRECTOR: Bw MARTLEY	APPROVED: BWM 3/31/00
QUALITY SECTOR: WB SMITH	APPROVED: WBS 3/31/00

SOUTH CAROLINA ELECTRIC & GAS CO.
URQUHART STATION REPOWERING
AIKEN COUNTY, SC

SITE PLAN
SHEET 1

DRAWING NUMBER: 591300-1-CV-0-SI.PL-01-C

DIRECT TESTIMONY OF

JOHN W. PRESTON, JR.

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS COMPANY

DOCKET NO. 2000-0170-E

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is John W. Preston, Jr. and my business address is 6248 Bush River Road, Columbia, South Carolina.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by SCANA Services, Inc. and am a Senior Engineer in the Corporate Environmental Services Department and serve as Section Head of the Generation Support Group.

Q. WOULD YOU PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE?

A. I graduated from the University of South Carolina with a Bachelor of Science degree in Chemical Engineering and a Master of Science degree in Engineering. I hold a Professional Engineer's license to practice engineering in South Carolina. I have worked in the environmental field for twenty-seven (27) years, nineteen of those with SCE&G. I am a research advisor to the Electric Power Research Institute, the Chairman of the Air Subcommittee of the South Carolina Chamber of Commerce Technical Committee, a Board member of the Carolinas Air Pollution Control Association, a member of the Central Midlands Clean Cities Coalition Planning Committee, a member of the Department of Health &

Environmental Control (DHEC) Clean Air Partnership, and a member of DHEC's Small Business Assistance Compliance Advisory Panel.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to discuss aspects of the Urquhart Repowering project which relate to environmental matters. I will describe the environmental advantages of the project, the permitting process, and the status of the acquisition of the required permits.

Q. PLEASE DESCRIBE THE ENVIRONMENTAL ADVANTAGES TO THE PROPOSED URQUHART PROJECT.

A. The first advantage is site utilization. SCE&G has operated three coal-fired boilers at this site for over 45 years. An existing site such as Urquhart is preferable over a "greenfield" site (new, undeveloped site) from the environmental perspective because a history of industrial activity has already been established.

The second advantage is a significant reduction in nitrous oxides, sulfur dioxide, and particulate matter emissions as a result of retiring two coal-fired boilers and replacing them with units fired by natural gas and #2 fuel oil. Aiken County, as well as the Augusta, Georgia area, are fast growing areas. It is projected that the ambient air quality in these areas will exceed the standard for ozone when the EPA's new ambient ozone standard becomes law. The reduction of nitrous oxides from the Re-powering project could reduce the risk of exceeding this new ozone standard in these areas. The reduction in sulfur dioxide and particulate matter should also have a positive effect on the surrounding air quality.

A complete application, including an air quality analysis, a secondary impacts analysis, and a Class I Area impact review, have been submitted to DHEC's Bureau of Air Quality.

A complete air quality analysis has been performed for the new combustion turbines as well as the impact of retiring the existing #1 and #2 boilers. Air quality impact determinations demonstrate that operation of this modified facility in conjunction with other emission sources will be in full compliance with the National Ambient Air Quality Standards (NAAQS). The air permit application demonstrates that the proposed changes of the Re-powering project will be in full compliance with applicable state and federal air pollution control requirements based on the worst case scenario of #2 fuel oil firing. Since the project proposes a change in fuel from coal to natural gas and #2 fuel oil, significant reductions in nitrous oxides, sulfur dioxide, and particulate matter emissions will result. For example, the nitrous oxides will be reduced from 200 to 300 parts per million when burning coal to 9 parts per million when burning natural gas.

A secondary impacts analysis and a Class I Area impact review were conducted to evaluate potential impacts on soil, vegetation, visibility, and potential associated economic growth. No areas of concern were identified. Impacts to Class I Areas that exhibit pristine air quality are not anticipated from this project, since the nearest Class I Areas are over 200 kilometers (125 miles) from Urquhart Station. The amount of coal stored on site also will be reduced.

The impact of wastewater discharges on the Savannah River will modestly improve in that the amount of water used within the new facility will be reduced

because of fewer wash-downs, fewer floor drains, reduced coal pile runoff, etc. The largest volume of water usage at Urquhart Station is the once-through cooling water that condenses the existing steam flow. This water usage will continue as part of the combined cycle mode. The cooling water discharge to the Savannah River will remain the same as it has in past years of Unit #1 and #2 boiler operation. The thermal impact on the Savannah River is minimal since the maximum volume (all three units) of the cooling water discharge is only seven per cent of the volume of the river at low-flow conditions.

Q. DISCUSS BRIEFLY THE ENVIRONMENTAL PERMITTING PROCESS AT THE URQUHART SITE.

A. In addition to the review process which is underway here before the Commission, the Company must make application to and receive approval from other regulatory agencies at the federal, state, and local levels. The construction and operation of the facility and its environmental impact on all media (air, water, and land) will be evaluated by primarily the South Carolina DHEC. An application for a DHEC Bureau of Air Quality permit has been filed, and construction cannot begin without the approval of the project through the issuance of the Air permit. This permit application will also be reviewed by the United States Environmental Protection Agency Region IV in Atlanta.

The project will require construction permits for wastewater treatment facilities and stormwater collection and treatment facilities. A construction stormwater discharge permit and a modification to the existing Urquhart NPDES permit to cover wastewater and stormwater discharges may be required. Applications for

construction permits and discharge permits for the wastewater facilities will be submitted when design drawings are available. The construction of the overall project can begin without the wastewater permits; however, construction of the wastewater treatment facility itself cannot begin without the wastewater permit. There are no wetlands involved with the construction project at the Urquhart plant site. The landfill operation will be impacted in a positive manner since there is little or no ash disposal when burning natural gas or #2 fuel oil as compared to burning coal which generates a significant amount of ash.

Q. WHAT IS THE STATUS OF THE ACQUISITION OF EACH REQUIRED PERMIT?

A. The permit application for DHEC's Bureau of Air Quality permit was submitted in December, 1999. The Agency requested additional information, and Duke/Fluor Daniel compiled the information and sent it to SCE&G on March 20, 2000. SCE&G submitted this information to DHEC on March 23. The air permit is expected to be issued by August, 2000.

The preliminary engineering report (PER) for the wastewater treatment facilities and the stormwater discharge is being reviewed internally by SCE&G personnel and is expected to be submitted to DHEC by the end of April. As part of the review of the PER, a determination will be made regarding the modification status of the NPDES water discharge permit. A permit to construct the wastewater facilities and to allow the stormwater discharge is expected to be issued by August, 2000.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

DIRECT TESTIMONY OF

CHARLES A. WHITE

ON BEHALF OF

SOUTH CAROLINA ELECTRIC & GAS

DOCKET NO. 2000-0170-E

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Charles A. White; my business address is 1426 Main Street, Columbia, South Carolina.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by South Carolina Electric and Gas Company (SCE&G or "the company") and serve as General Manager, Transmission Planning and System Control.

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL BACKGROUND AND BUSINESS EXPERIENCE.

A. I graduated from the University of South Carolina with a Bachelor's degree in Electrical Engineering and a Master's degree in Business Administration. I am a registered Professional Engineer, a member of the Institute of Electrical & Electronics Engineers, and have held the chairmanship of various IEEE technical committees.

I began working for South Carolina Electric & Gas Company in 1966 and during my career I've held positions in Overhead and Underground Distribution and Transmission; Metering; Material Standards and Product Testing; Transmission, Substation and Distribution Engineering.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. In connection with the Urquhart Re-powering Project, my testimony is to discuss the need and necessity for the associated new 230 kV transmission facilities. The Urquhart Re-powering Project will require two new 230 kV transmission lines originating at SCE&G's Urquhart Station and connecting to the existing grid at Urquhart Junction. See Exhibit No. _____(CAW-1). These two transmission lines will connect to the existing Graniteville to Savannah River Site 230 kV transmission line which passes through Urquhart Junction. These two new transmission lines will be constructed with 1272 KCM (thousand circular mills) ACSR (Aluminum Conductor Steel Reinforced) and will be approximately 6.3 miles in length. Transmission tower design and usage of existing right-of-way will be as indicated in Exhibit No. _____(CAW-2).

Q. WHAT CRITERIA DO YOU USE TO DETERMINE WHEN NEW TRANSMISSION OR SUBSTATION FACILITIES ARE NEEDED?

A. Our company subscribes to the guidelines established by the North American Electric Reliability Council (NERC), the Southeastern Electric Reliability Council (SERC), and SCE&G's Long Term Planning Criteria. All of these criteria can be briefly summarized as: the SCE&G Transmission System must be designed such that during any of the following contingencies, only short-time overloads, low voltages, and local loss of load will occur. After appropriate switching and re-dispatching, all non-radial loads can again be served with reasonable voltages, and all facilities can again operate within acceptable limits. These contingencies are:

1. Loss of any generator with normal or delayed clearing.
2. Loss of any transmission circuit operating at a voltage level of 115 kV or above with normal or delayed clearing.
3. Loss of any transmission transformer with normal or delayed clearing.
4. Loss of any electrical bus and associated facilities operating at a voltage level of 115 kV or above with normal clearing.
5. Loss of entire generating capacity in any one plant with normal clearing.
6. Loss of all circuits on a common structure with normal clearing.
7. Loss of any generating unit simultaneously with the loss of a single transmission line with normal clearing.

8. Loss of all components associated with a breaker failure.

9. Loss of any generator, transmission circuit, or transmission transformer, followed by manual system adjustments, followed by the loss of another generator, transmission circuit, or transmission transformer.

Q. WHY ARE THE NEW TRANSMISSION FACILITIES NEEDED?

A. Previous testimony has already addressed the issue of the need for additional generating capacity. These two transmission lines are needed to connect the two new 150 MW gas-fired turbines associated with the Urquhart Re-powering Project into the SCE&G power grid to assure system reliability and to satisfy growing power requirements. The new generating capacity and associated transmission lines provide added support to the western area of SCE&G's service area.

Q. WERE OTHER ALTERNATIVES CONSIDERED IN ORDER TO CONNECT THESE TURBINES TO THE EXISTING GRID?

A. Yes, we considered increasing the capability of the existing 115 kV transmission lines that originate at Urquhart Station to accommodate the additional generating capability. We determined that this alternative required rebuilding portions of four 115 kV transmission lines originating at Urquhart Station. These four rebuilds total 86 miles and would have a substantially higher cost than the recommended proposal of connection.

Q. PLEASE DESCRIBE THE ACTUAL ROUTES FOR THE PROPOSED TRANSMISSION LINES WITH REGARD TO ENVIRONMENTAL EFFECTS.

A. The proposed 230 kV transmission lines will be located within the same right-of-way with four existing 115 kV transmission lines. Constructing the proposed 230 kV transmission lines on existing cleared right-of-way minimizes any environmental effects.

Q. WAS ADDITIONAL RIGHTS-OF-WAY REQUIRED?

A. No additional right-of-way is needed because the proposed transmission lines will be constructed on an existing 325' wide right-of-way.

Q. WAS ANY STUDY MADE CONCERNING THE ENVIRONMENTAL EFFECTS OF THESE NEW TRANSMISSION FACILITIES?

A. Yes, a study was conducted by General Engineering, A Division of General Engineering Laboratories, Inc., of Charleston SC. The study was completed March 15, 2000. The final assessment was included in the Application submitted to the Public Service Commission.

Q. WHAT WERE THE CONCLUSIONS OF THIS ASSESSMENT?

A. The proposed transmission lines will have no significant effects on land use, vegetation, wildlife, or threatened and endangered species. The assessment identified jurisdictional wetlands, designated floodplains and floodways in the existing cleared 325' right-of-way.

Appropriate measures, such as placement of structures on elevated slopes and ridges above the bottom adjacent drainage features will limit construction activities in these areas. No wetlands will be affected by the construction of these transmission lines.

The positive effects of increased reliability of electrical power and using an existing cleared right-of-way in lieu of undeveloped and undisturbed land will compensate for minimal visual effects of slightly taller towers and temporary effects associated with construction of the proposed transmission lines.

Q. WAS AN ARCHAEOLOGICAL STUDY CONDUCTED?

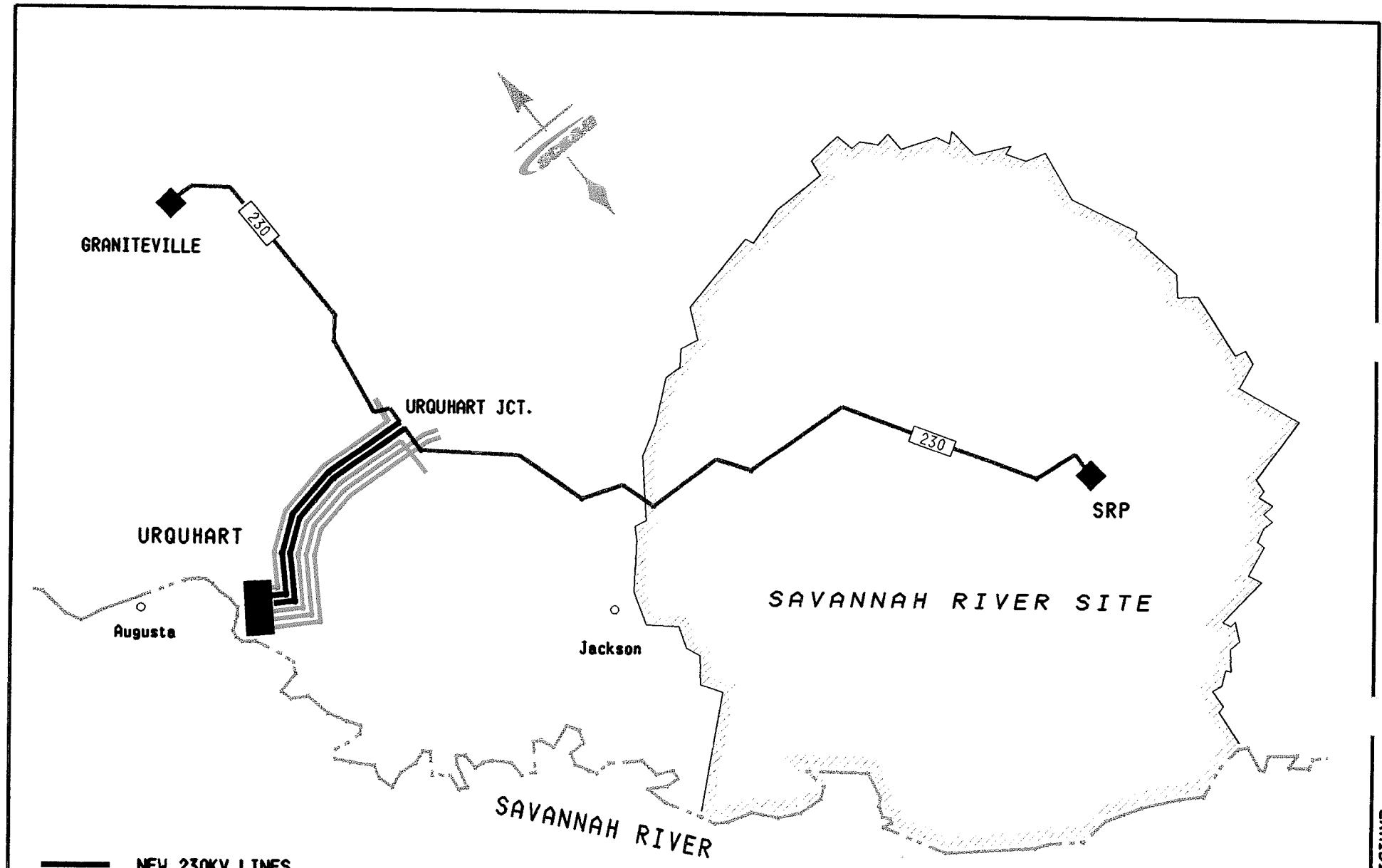
A. A review by General Engineering of the records at South Carolina Institute of Archaeology and Anthropology (SCIAA) found no known or recorded archaeological sites in the transmission line corridor.

Q. WHAT IS THE ESTIMATED COSTS OF THESE ASSOCIATED TRANSMISSION LINES AND THE SUBSTATION?

A. The two 230kV transmission lines will cost approximately $3,087,400 and the substation at Urquhart Station will cost approximately $1,950,000. See Exhibit No. _____(CAW-3) for the substation layout. The total estimated cost of these associated transmission lines and the substation is $5,037,400.

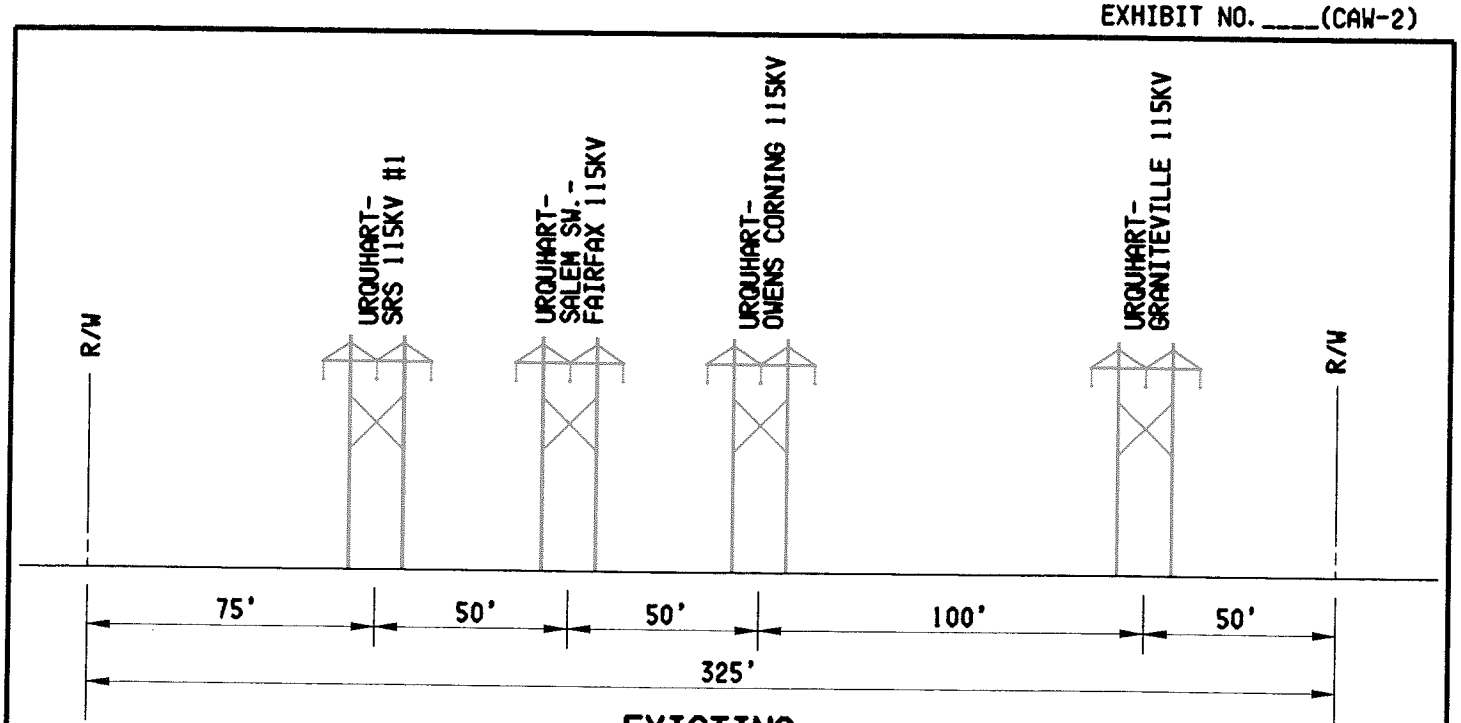
Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes

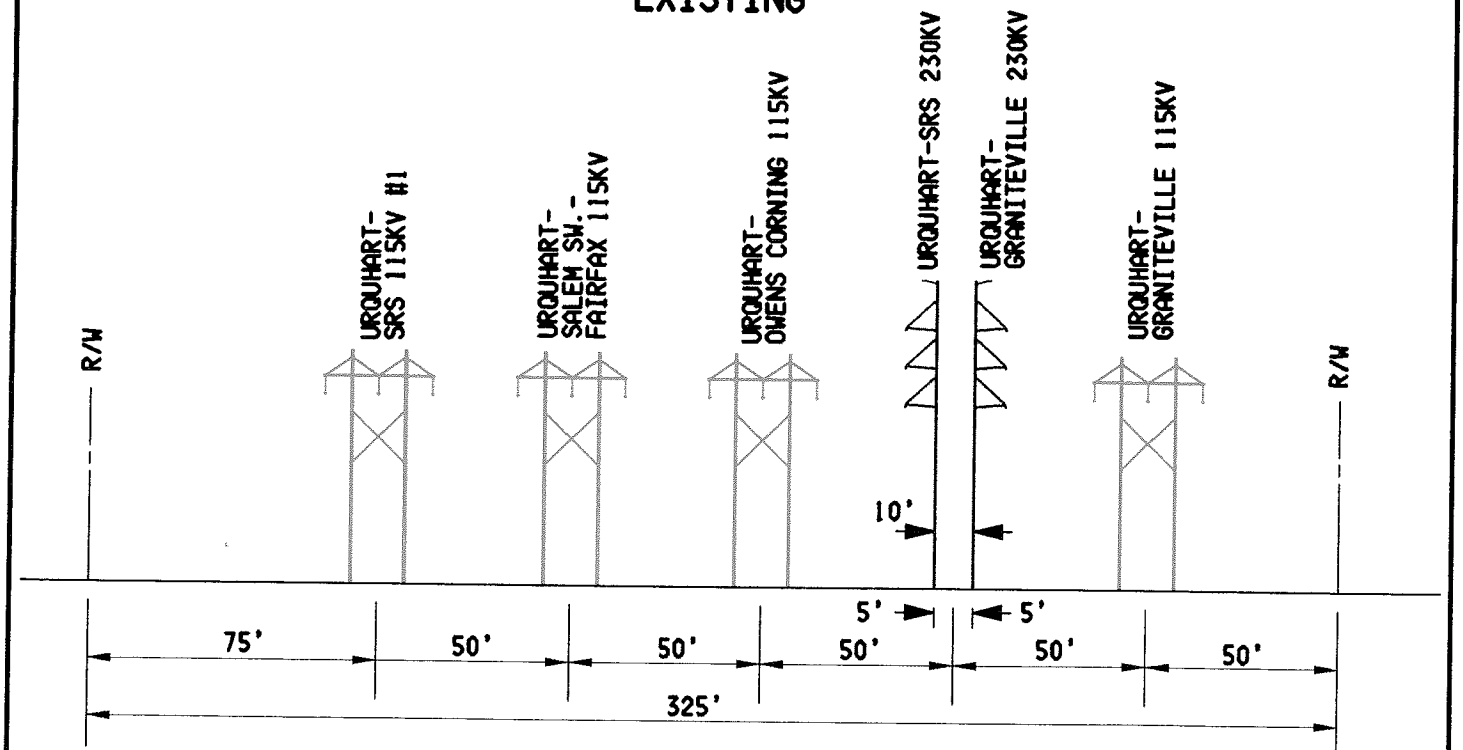


URQUHART-URQUHART JCT. 230KV FOLDIN
LOCATION MAP

EXHIBIT NO. ____ (CAW-1)

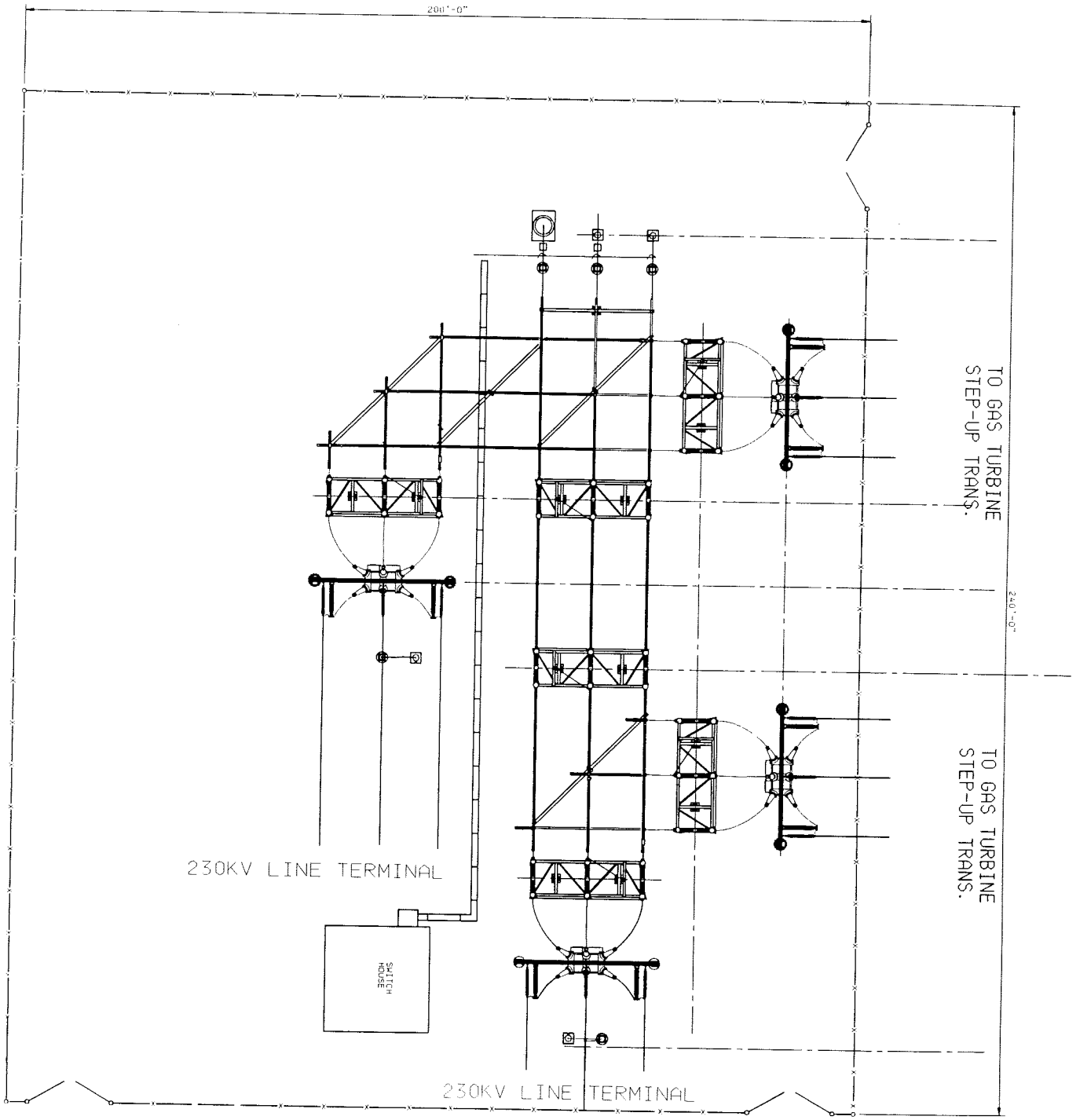


EXISTING



PROPOSED

URQUHART-URQUHART JCT. 230KV FOLDIN
R/W CORRIDOR



URQUHART 230KV SUB (2217)